A Review of Network Based Mobility Management Schemes, WSN Mobility in 6LoWPAN Domain and Open Challenges

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Abstract

Wireless Sensor Nodes (SNs) in Internet of Things (IOT), have revolutionized and changed the perspective of internet. With the introduction of IPv6 over Low Power Wireless Personal Area Network (6LoWPAN), it is possible to connect these constrained devices to IPv6 Networks and transmit IPv6 packets. Mobility of such devices is achieved by deploying/installing them on many mobile (moving) objects including mobile gadgets, physical objects (living or non-living) etc. Therefore it requires sufficient Mobility Management Schemes for data transmission. Host based mobility protocols; MIPv6 and its extensions are not suitable for resource constrained devices. In this paper, our focus is to study PMIPv6 based mobility management and different Scenarios based on it along with sensor's mobility. Although existing research has made many improvements in terms of HO latency but less attention has paid towards signaling cost and packet loss, particularly in time critical areas. The study provides the complete survey of network based mobility management schemes, 6LoWPAN mobility and challenges associated with them.

Keywords: IP Mobility, MIPv6, PMIPv6, 6LoWPAN mobility and WSN

1. Introduction

IP Mobility and IOT; one of the current research topics are getting popularity in mobile communication and networked devices. With the tremendous and rapid increase of mobile devices/gadgets connected to the network has given rise to the new field of research for the researchers and has led to an anticipated depletion of addresses in the current Internet Protocol version 4 (IPv4), so there is a newer version of IP *i.e.*, IP version 6 (IPv6) [57] which provides sufficient address space to meet the expected increase of network devices and hence the emergence of new technology called Internet of Things (IOT) [23], where most of the physical objects will be connected to the network. In IOT, the objects are mostly mobile and therefore requires a mobility management protocol for maintaining IP mobility. Also the users carrying mobile gadgets like cell phones, laptops or smartphones etc. want to remain connected to the network services all the time while they are on the move (i.e. moving from one network to another). In order to provide the mobile users uninterrupted services or to track the signaling from moving objects, there is need of mobility management schemes which were introduced initially for IPv4 [1]. In IOT or simply machine to machine (M2M) communication [58], IPv6 addressed Sensor nodes (SNs) are being used for making the objects to communicate. IPv6 over Low-Power Personal Area Networks (6LoWPAN) standard allows these heavily resource constrained SNs to connect to IPv6 networks. Mobility in 6LoWPAN is based on standardized network mobility management protocols [11]. Researchers have used 6LoWPAN mobility with different perspective and application areas